

DRIVING SYSTEM FOR GARAGE DOOR

FIELD OF THE INVENTION

The present invention relates to a driving system for a garage door and the driving system is easily to assemble and includes a convenient quick release device.

BACKGROUND OF THE INVENTION

5 A conventional garage door is generally composed of several plates which are pivotably connected with each other and can be moved along two side rails by a driving system. The driving system includes a motor that drivers a threaded rod and a connection member is threadedly connected to the threaded rod so that when the
10 threaded rod is rotated, the connection member is moved on the threaded rod. Two ends of a chain are connected to the connection member such that when the threaded rod is rotated, the chain is moved to open and close the garage door. This system involves a complicated structure that requires a lot of time to install. The chain is composed of several plates which are connected by pins and the plates could be
15 jammed at a certain angle during operating if the connection portions of the pins and the plates lack proper lubrication. Furthermore, the threaded rod is received in a track which includes an open side facing downward and lubricant on the threaded rod could drop on the vehicle or people who stand under the track.

The present invention intends to provide a driving system for a garage door
20 that is easily to be installed and the open side of the track faces upward.

Another object of the present invention is to provide a quick release device for manual operation of the garage door.

SUMMARY OF THE INVENTION

The present invention relates to a driving system for a garage door and comprises a track cantilevered to a wall and having an open side that faces upward. A driving assembly is movably received in the track and driven by a motor which is located to the other end of the track. A power transferring member has two ends
5 connected to the driving assembly. A U-shaped member is movably engaged with the track from an underside of the track and two sides of the U-shaped member are connected to the driving assembly. One end of a link is pivotably connected to the U-shaped member and the other end of the link is connected to the garage door.

The present invention will become more obvious from the following
10 description when taken in connection with the accompanying drawings which show, for purposes of illustration only, a preferred embodiment in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows the driving system connected to a garage door which is in
15 close position;

Fig. 2 is a perspective view to show the driving system and the links;

Fig. 3 is an exploded view to show the driving system of the present
invention;

Fig. 4 shows the engagement of the pulling member and the connection
20 member of the driving system of the present invention;

Fig. 5 is a perspective view to show the driving system of the present
invention;

Fig. 6 shows the power transferring member is a belt which reeves through a wheel;

Fig. 7 shows a driving shaft of a motor and the gear of the driving system of the present invention;

5 Fig. 8 shows that the pulling member is pulled and disengaged from the connection member;

Fig. 9 shows that the pulling member is engaged from the connection member, and

10 Fig. 10 shows the garage door is opened by operation of the driving system of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figs. 1 to 5, the driving system 10 for a garage door 11 of the present invention comprises a track 12 which has one end thereof fixed on an inside of a wall 11 and the other end of the track 12 is connected to a motor 60 (Fig. 7). The track 12 has an open side that faces upward and a driving assembly 20 is movably received in the track 12 and driven by the motor 60.

The driving assembly 20 comprises a base 21 and a cover 22 which is mounted to the base 21. The base 21 has two grooves 210 and the cover 22 has two grooves 220 which are located in alignment with the grooves 210. A connection member 51 has a clamping recess 510 defined in each of two ends thereof and the connection member 51 is movably received in a space defined by the aligned groove 210 and the groove 220. A power transferring member 50 such as a toothed belt which includes two ends that are respectively engaged with the two clamping

recesses 510. Therefore, when the connection member 51 is moved in the grooves 210, 220, the belt is moved in the grooves 210, 220 with the connection member 51. The cover 22 has a window 222 and the base 21 has a concavity 211 defined in a top thereof. A quick release mechanism 30 includes a retaining member 23 and a pulling member 31, wherein the retaining member 32 is located between the base 21 and the cover 22. A protrusion 230 extends from an underside of an end of the retaining member 23 and is rotatably received in the concavity 211 so that the retaining member 31 may pivot or swing about the protrusion 230. A recessed area 231 is defined in a top of the retaining member 23 and a stop 232 extends from a surface of the recessed area 231 so as to define an annular path around the stop 232. The pulling member 31 is overlapped on the retaining member 23 and has a tongue 310 extending from an end thereof. The tongue 310 extends through a gap 221 defined in a protrusion portion located at the underside of the cover 22 so as to be removably engaged with a recess 511 defined in a side of the connection member 51 as shown in Fig. 9. A top plate 312 extends from a top of the pulling member 31 and movably extends through the window 222 of the cover 22. A boss 311 extends from an underside of the pulling member 31 and is movably engaged in the annular path of the retaining member 23.

A spring 32 has one end 321 connected to a hole 315 in the top plate 312 and the other end of the spring 32 is hooked to a ring 224 on the cover 22 so as to bias the tongue 310 to be normally engaged with the recess 511 of the connection member 51. A rope 33 has an end fixed to a hole 313 of the top plate 314 such that when the user pulls the rope 33, the top plate 312 is removed and the tongue 310 is

disengaged from the recess 511 of the connection member 51. A notch 314 is defined in the top plate 321 and located beside the hole 313 for being connected to another rope which is not shown.

5 A U-shaped member 40 is movably engaged with the track 12 from an underside of the track 12 and two sides of the U-shaped member 40 are connected to the driving assembly 20. The cover 22 having two lugs 223 extending from a top of each of two sides thereof and two pins 24 extend through the two sides of the U-shaped member 40, two mediate members 70 and the two respective pairs of lugs 223 aligned with each other. One of the mediate members 70 has a guide hole 700 in
10 an end thereof so that the rope 33 is engaged with the guide hole 700.

A link system includes a straight first link 41 and an L-shaped second link 42, one end of the first link 41 is pivotably connected to a hole 402 in an extension plate 401 on the U-shaped member and the other end of the first link 41 is connected to a first end of the second link 42 by extending pins through positioning holes 410
15 and 420 in the first link 41 and the second link 42. A second end of the second link 42 is connected to the garage door 11. As shown in Fig. 10, when the motor 60 is activated and drives the belt, the connection member 51 is moved and the link system pulls the garage door 11. The garage door 11 is composed of several plates which are connected with each other pins 110 and the garage door 11 can be bent
20 and pulled to be opened.

As shown in Fig. 6, the power transferring member 50 reeves a gear 52 in the second end of the track 12 and the gear 52 is connected to a board 53. A adjusting bolt 54 extends through a block fixed in the track 12 and is connected to

the board 53. A spring 55 is mounted to the bolt 54 and biased between the block and the head of the bolt 54 so that the distance from the gear 52 to the first end of the track 12 can be adjusted by rotating the adjusting bolt 54.

Referring to Fig. 8, when the driving system 10 cannot receive the signal from a remote control of the garage door 11, the user may pull the rope 33 to disengage the tongue 310 from the recess 511 in the connection member 51. When first pulling the rope 33, the boss 311 of the pulling member 31 is moved backward along the annular path around the stop member 232 in the retaining member 23 and then is stopped by the stop member 232 when releasing the rope 33 so that the tongue 310 is kept at a position that is disengaged from the recess 511 of the connection member 51. If the user pulls the rope 33 again, the boss 311 leaves the stop member 232 and goes back to its original position as shown in Fig. 9.

As shown in Fig. 7 which shows another embodiment of the gear 520 and the power transferring member, wherein the gear 520 is rotatably located in the track 12 and has an engaging hole defined therethrough. The power transferring member is a chain 56 which reeves through the gear 520. The track 12 has an opening defined therethrough and located in alignment with the engaging hole of the gear 52. The motor 60 has a driving shaft 61 extending therefrom and the shaft 61 extends through the opening of the track 12 and engaged with the engaging hole of the gear 520. This is typically convenient for the assemblers to connect the motor 60 and the driving system of the garage door.

While we have shown and described the embodiment in accordance with the present invention, it should be clear to those skilled in the art that further

embodiments may be made without departing from the scope of the present invention.